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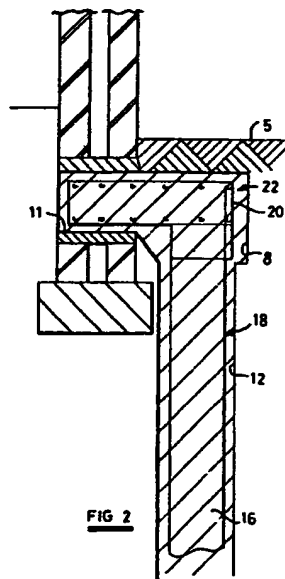
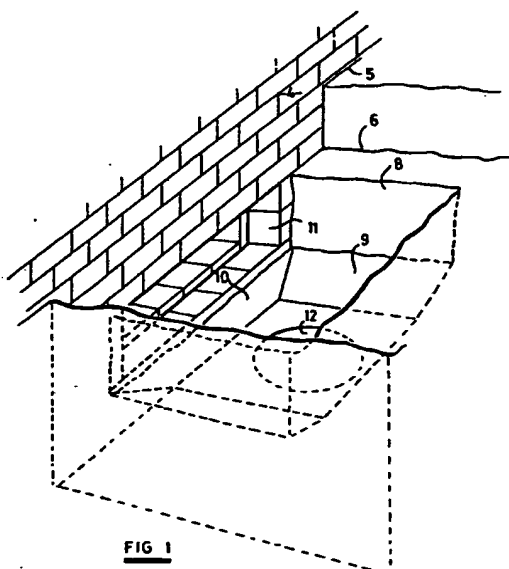
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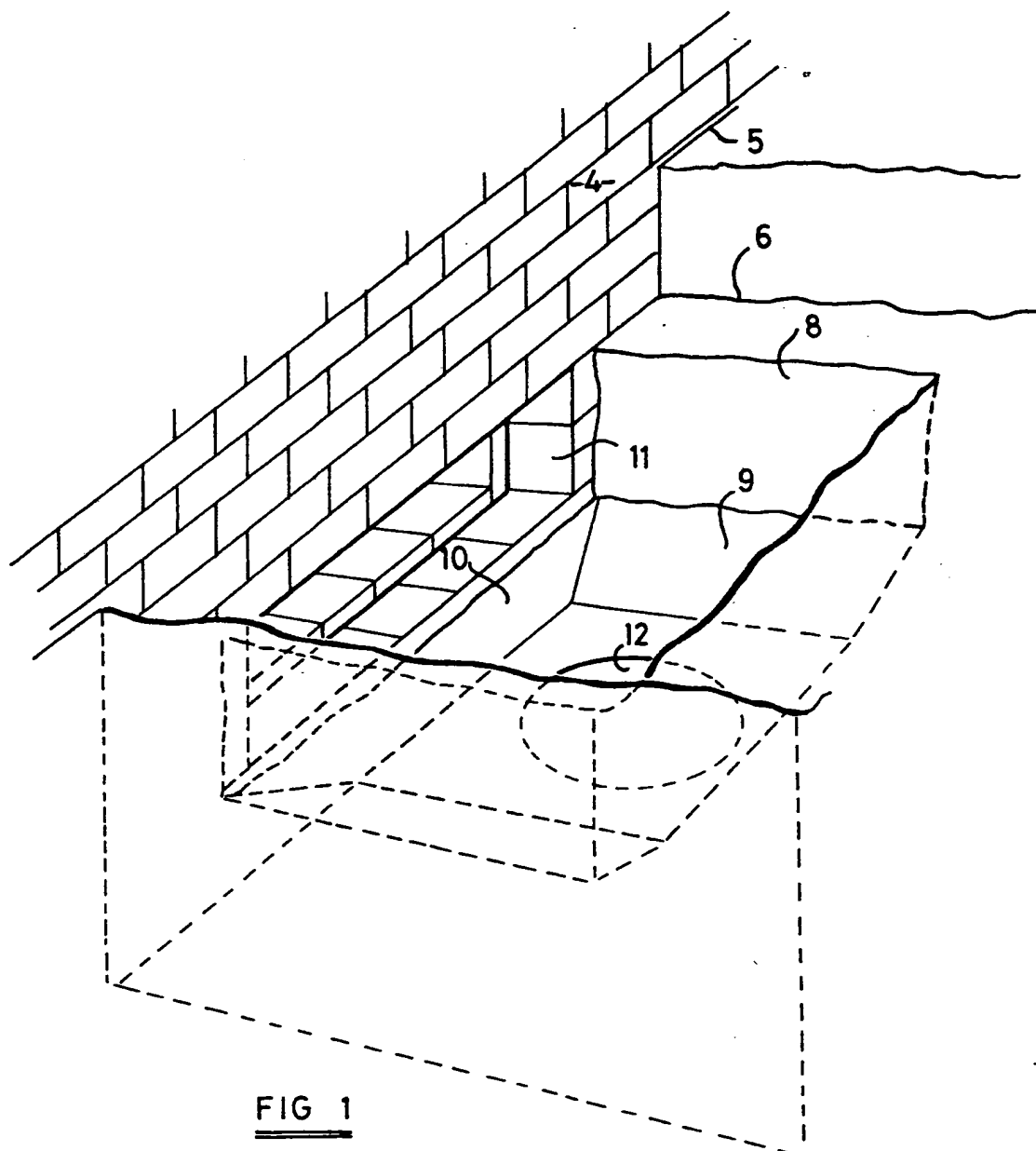
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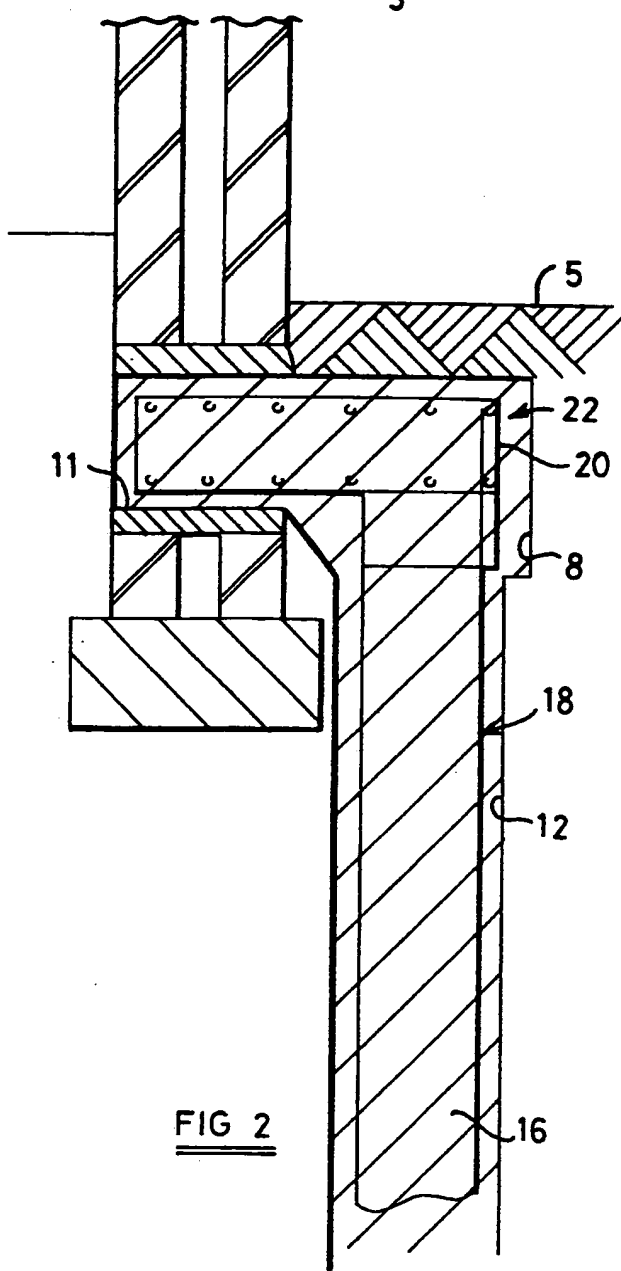
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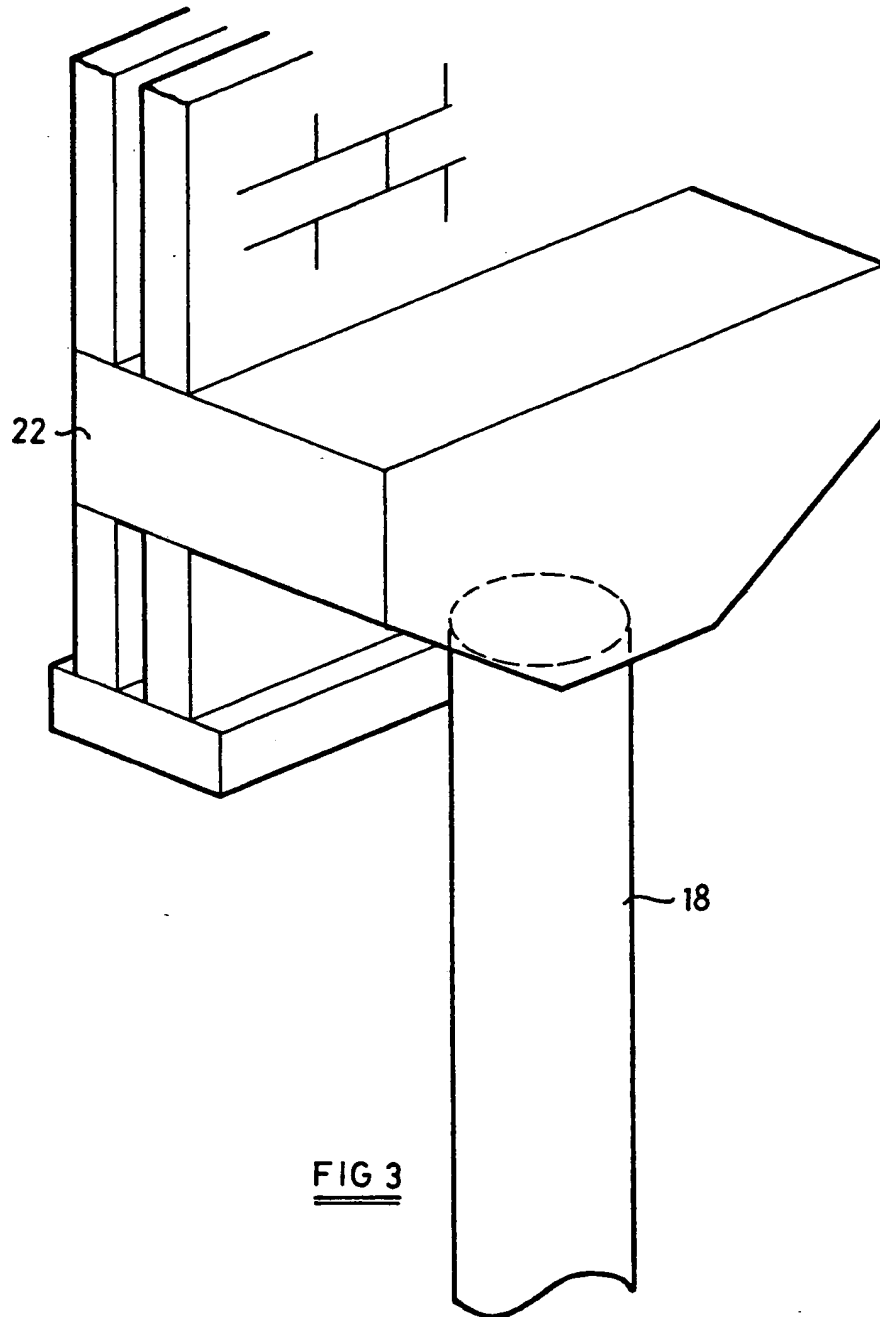
(54) Underpinning of a wall

(57) In the underpinning of a wall (4), a shallow pit (6) is dug alongside the wall, from which a cavity (8) is dug, the cavity (8) extending generally as a rectangle for a depth of typically three-quarters of brickwork. From within the cavity (8) brickwork is removed to provide a cavity (11) in the wall. A vertical hole (12) is then augered from the base of the cavity (8), typically to a depth of 3.0 metres. A prefabricated steel cage (16) is inserted into the augered hole, and is intermeshed with a prefabricated steel reinforcement cage (20) which is located within the cavity (8) and which extends into the cavity (11) in the wall. Concrete is then admitted to the bore, and to fill the cavities (8 and 11), to provide a supporting member to provide load bearing support for the wall.









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Title: "Improvements relating to underpinning"

Description of Invention

This invention is concerned with improvements relating to underpinning. The invention has been devised for the underpinning of walls of domestic premises, in which context the invention will hereinafter be described. It is however to be appreciated that the invention is applicable to underpinning in general, and specifically to the underpinning of other than walls of domestic premises.

A number of methods are presently used for the underpinning of domestic premises, most of which suffer from one or more of the following disadvantages:

- (i) the removal of large quantities of spoil from the site is necessary;
- (ii) the use of large quantities of concrete is necessary;
- (iii) the insertion of piles from both sides of the premises is necessary, necessarily involving the householder with considerable disruption;
- (iv) the use of pile-driving techniques is involved, which can be deleterious to an already-weakened building;
- (v) there is a need to support the wall to be underpinned whilst a ground beam is being constructed;
- (vii) high cost is involved.

According to this invention there is provided a method of underpinning in which an elongate hole is provided adjacent to a wall to be supported, and a one-piece supporting member is provided so as to extend within and from the hole into or beneath said wall to support said wall.

The hole may conveniently be augered, advantageously extending along a generally upright axis spaced a short distance outwardly from the wall, and the supporting member may be provided by the casting of (e.g.) concrete into the hole, together with the use (if desired) of reinforcement.

Advantageously a cavity is provided beneath or within the wall, into which concrete flows, the cavity being provided (if desired) with reinforcement.

According to this invention there is also provided a supporting member for the underpinning support of a wall, the support member comprising a elongate portion extending in a generally vertical hole along side the wall, and a cantilevered portion extending from the elongate portion into or beneath the wall, to support the wall.

Preferably the elongate and cantilevered portions are integral, conveniently being afforded by a member cast, conveniently of reinforced concrete, in situ.

According to this invention there is also provided a method of underpinning a wall involving the steps:

- (a) exposing a portion of the wall;
- (b) providing a cavity extending into or beneath the wall;
- (c) providing an elongate hole extending generally downwardly from a position adjacent to the cavity;
- (d) casting a suitable material into the elongate hole and cavity to provide a supporting member.

Preferably the portion of the wall which is exposed and in which the cavity is provided is below the ground level but conveniently above footings of the wall.

Preferably the elongate hole is provided, such as by a drilling or augering operation, so as to extend generally vertically along side the cavity, although if desired a pile casing may be driven to provide the hole.

Preferably the cast material comprises a cementitious material such as concrete, together with reinforcement (e.g. steel) for the elongate portion and the cantilevered portion.

There will now be given detailed descriptions, to be read with reference to the accompanying drawings, of a method of underpinning, and a supporting member for underpinning, which are preferred embodiments of this invention, having been selected for the purposes of illustrating the invention by way of example.

In the accompanying drawings:

FIGURE 1 is schematic perspective view illustrating an initial stage during the performance of the preferred method;

FIGURE 2 is a schematic vertical sectional view showing the preferred supporting member in a position supporting a wall; and

FIGURE 3 is an isometric sketch of the supporting member.

In the performance of the method which is the preferred embodiment of this invention, initially a shallow pit 6 is dug along side the wall to be supported, from which a cavity 8 is dug, the cavity 8 extending generally as a rectangle for a depth of (typically) three courses, of brickwork, and thereafter being inclined inwardly as at 9, and slightly away from the wall, as at 10.

From within the cavity three vertical courses of brickwork are removed, starting at the second course of brickwork below the ground level 5, by approximately three lengths of brick, to provide a cavity 11 extending from the cavity 8 which is approximately 250 mm deep x 600 mm wide.

If necessary, the gap between a two course brick wall may be temporarily sealed around the cavity 11.

A vertical hole 12 is augered from the base of the cavity 8, typically having a diameter of 250 mm to 300 mm and a depth of 3.0 metres, which may if desired be appropriately lined.

A prefabricated steel helical cage 16 is inserted into the augured hole, and is intermeshed with a prefabricated steel reinforcement cage 20 which is located within the cavity 8 and which extends into the cavity 11 in the wall. Concrete is then admitted to the bore 12, and to fill the cavities 8 and 11 to the level of the cavity 11.

On curing the concrete provides a supporting member which comprises a steel-reinforced augered pile 18 from which a cantilevered supporting portion 22 extends into the cavity 11 of the wall, to provide load bearing support for the wall.

In the preferred embodiment the hole 12 is shown extending vertically, a distance of approximately 100 mm outwardly from the wall 4 to be supported. Strict verticality is of course not necessary, and if desired the hole 12 may be bored so as to incline either away from or slightly towards the wall 4. In addition whilst in the preferred embodiment the cantilevered portion 20 is shown extending into a cavity 11 provides within the wall 4 above the level of the existing footings 14, if desired the supporting member may be provided so as to extend beneath the footings, although in general this will be less convenient than the method hereinbefore described.

Depending upon the degree of support required for the wall 4, the method above described may be repeated at intervals along the length of the wall.

By the use of the invention above described, an existing wall may be underpinned quickly, conveniently and without undue expense. In particular, adequate vertical load bearing may be achieved solely from the exterior side of the wall 4, and with a relatively small requirement for space, in particular, the method above described may be carried out where as little as 1.0 metres of space is available from the wall being supported.

Where the invention is utilised in situations where "heave" - that is expansion of the soil beneath the foundations - is likely to occur, the cavity 11 may be enlarged downwardly, and the removed bricks replaced by an appropriate "anti-heave" material, such as clayboard. In this manner, any upward movement of the wall 4 as may occur will be accommodated by compression of the clayboard, removing potentially damaging upward stresses on the cantilevered head.

The features disclosed in the foregoing description, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, or a class or group of substances or compositions, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS:

1. A supporting member for use in the underpinning support of a wall, the support member comprising a elongate portion extending in a generally vertical hole alongside the wall, and a cantilevered portion extending from the elongate portion into or beneath the wall, to support the wall.
2. A supporting member according to Claim 1 wherein the elongate and cantilevered portions are integral.
3. A supporting member according to one of Claims 1 and 2 being cast in situ.
4. A method of underpinning a wall involving the steps:
 - (a) exposing a portion of the wall;
 - (b) providing a cavity extending into or beneath the wall;
 - (c) providing an elongate hole extending generally downwardly from a position adjacent to the cavity;
 - (d) casting a suitable material into the elongate hole and cavity to provide a supporting member.
5. A method according to Claim 4 wherein the portion of the wall which is exposed and in which the cavity is provided is below ground level.
6. A method according to one of Claims 4 and 5 wherein said portion of the wall in which the cavity is provided is above footings of the wall.
7. A method according to any one of Claims 4 to 6 wherein the elongate hole extends generally vertically alongside the cavity.
8. A method according to any one of Claims 4 to 7 wherein the hole is provided by drilling or augering operation.

9. A method according to one of Claims 4 and 7 wherein a pile casing is driven to provide the hole.
10. A method according to any one of Claims 4 to 9 wherein the cast material comprises cementitious material, together with reinforcement.
11. A supporting member for the underpinning support of a wall, constructed and arranged substantially as hereinbefore described with reference to the accompanying drawings.
12. A method of underpinning a wall, when carried out substantially as hereinbefore described with reference to the accompanying drawings.
13. Any novel feature or novel combination of features as hereinbefore described and/or as shown in the accompanying drawings.